IN THE CLAIMS

1. – 2. (cancelled)

3. (previously presented) A protecting route design method for a communication network including a plurality of nodes having preset information on a protecting route to switch over in parallel from a working route thereto when link or node failure occurs, according to a failure notification message including failure location information being transmitted from a failure detection node to each node, the protecting route design method comprising the steps of:

searching a protecting route which can minimize a transfer time of the failure notification message from the failure detection node; and

then, updating the searched protecting route to a protecting route having a spare communication capacity sharable for a different failure and having a route switchover time to be completed within a given time limit,

wherein a switchover time to the protecting route in each node is calculated from a difference between a given restoration time limit and the transfer time of failure notification message to the each node.

4. (previously presented) A protecting route design method for a communication network including a plurality of nodes having preset information on a protecting route to switch over in parallel from a working route thereto when link or node failure occurs, according to a failure notification message including failure location information being transmitted from a failure detection node to each node, the protecting route design method comprising the steps of:

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searching a protecting route which can minimize a transfer time of the failure notification message from the failure detection node; and

then, updating the searched protecting route to a protecting route having a spare communication capacity sharable for a different failure and having a route switchover time to be completed within a given time limit,

wherein the transfer time of failure notification message from the failure detection node is calculated from a summation of a transmission delay time of the failure notification message being transmitted on communication links and an input and output processing time of the failure notification message processed in the each node, and wherein a switchover time to the protecting route in each node is calculated from a difference between a given restoration time limit and the transfer time of failure notification message to the each node.

5. (previously presented) The protecting route design method according to claim 12, wherein a restoration time of the protecting route is obtained by calculating a summation of the transfer time of failure notification message to each node and a switchover time to the protecting route in each node, then by extracting the maximum value of the summation for entire nodes along the protecting route.

6. (previously presented) The protecting route design method according to claim 12, wherein another protecting route is searched excluding a link which has not any sharable spare communication capacity between the end nodes of the route, so as to reduce a total spare communication capacity and a route search time.

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7. (previously presented) The protecting route design method according to claim 12, wherein another protecting route is searched affording priority to a link having a large sharable spare communication capacity between the end nodes of the route, so as to reduce a total spare communication capacity and a route search time.

8. (previously presented) A protecting route design method for a communication network including a plurality of nodes having preset information on a protecting route to switch over in parallel from a working route thereto when link or node failure occurs, according to a failure notification message including failure location information being transmitted from a failure detection node to each node, the protecting route design method comprising the steps of:

searching a protecting route which can minimize a transfer time of the failure notification message from the failure detection node; and

then, updating the searched protecting route to a protecting route having a spare communication capacity sharable for a different failure and having a route switchover time to be completed within a given time limit,

wherein another protecting route is searched affording priority to a link having a large sharable spare communication capacity between the end nodes of the route, so as to reduce a total spare communication capacity and a route search time, and wherein, at the time of the search of another protecting route by affording priority to a link having a large sharable spare communication capacity, a sharable spare communication capacity value exceeding any value assigned to another link is temporarily afforded to a link on a working route, so as to reduce a

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transfer time of the failure notification message from the failure detection node to each node

along the protecting route.

9. (previously presented) The protecting route design method according to claim 12,

wherein another protecting route is searched excluding a node at which a transfer time of the

failure notification message exceeds a predetermined restoration time, so as to reduce a route

search time.

10. (previously presented) The protecting route design method according to claim 12,

wherein calculation of a transfer time of a failure notification message is selectively employed

depending on a topology or a scale of an object communication network, a node equipment

specification, and a communication system.

11. (original) The protecting route design method according to claim 3, wherein

calculation of a switchover time to a protecting route is selectively employed depending on a

topology or a scale of an object communication network, a node equipment specification, and a

communication system.

12. (previously presented) A protecting route design method for designing protecting

route information on a protecting route, and presetting the designed protecting route information

in a plurality of nodes provided in a communication network, before occurrence of a link or node

failure in the communication network, wherein the plurality of nodes switch over in parallel from

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a working route to the protecting route on the basis of the protecting route information present in the plurality of nodes when link or node failure occurs, according to a failure notification message including failure location information, transmitted from a failure detection node to each of the plurality of nodes, the protecting route design method comprising the steps of:

searching by a network management system, provided in the communication network, for a preliminary protection route, the preliminary protecting route for minimizing a transfer time of the failure notification message which is transmitted from a node detecting link or node failure;

updating the searched preliminary protecting route to the protecting route having a spare communication capacity sharable for a different failure, the protecting route having a route switchover time to be completed within a given time limit; and

presetting the protecting route information on the updated protecting route in the plurality of nodes, the protecting route information including the failure location information associated with an identifier of the corresponding protecting route, the failure location information indicating a location of the link or node failure in the communication network.

13. **(currently amended)** The protecting route design method according to claim 12, wherein the transfer time of the failure notification message from the failure detection node is calculated from a summation of a transmission delay time of the failure notification message being transmitted on communication links and an input and output processing time of the failure notification message processed in the each node.

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